

## **What is claimed is:**

**[Claim 1]** 1. A CT detector comprising:

a scintillator module including at least one scintillator configured to be impinged with radiographic energy from a radiographic energy source;  
at least one indexing pin connected to the scintillator module; and  
a collimator assembly having a plurality of collimator elements and a plurality of teeth configured to define a relative position of the plurality of collimator elements and a portion thereof configured to engage the at least one indexing pin.

**[Claim 2]** 2. The CT detector of claim 1 wherein the at least one scintillator includes a plurality of scintillators uniformly arranged in a scintillator array.

**[Claim 3]** 3. The CT detector of claim 1 wherein at least two of the plurality of teeth are constructed to flank an indexing pin.

**[Claim 4]** 4. The CT detector of claim 1 wherein the plurality of teeth have a first set of teeth extending in a first direction and a second set of teeth extending in a second direction generally transverse to the first direction.

**[Claim 5]** 5. The CT detector of claim 4 wherein the indexing pin is generally flanked by at least two teeth of the second set of teeth and has a side surface constructed to abut a side surface of the second set of teeth.

**[Claim 6]** 6. The CT detector of claim 1 further comprising at least one photodiode configured to detect illumination of the at least one scintillator.

**[Claim 7]** 7. The CT detector of claim 1 incorporated into a rotatable gantry of a CT imaging system.

**[Claim 8]** 8. A scintillator–collimator combination comprising:

a plurality of collimator elements configured to collimate x-rays projected thereat;  
a scintillator module having a scintillator pack formed of a material configured to illuminate upon reception of x-rays; and  
a comb having a first set of teeth and a second set of teeth extending in a direction generally transverse to the first set of teeth, the first set of teeth and the second set of teeth constructed to align the plurality of collimator elements and the second set of teeth constructed to engage the scintillator module and align the scintillator module relative to the plurality of collimator elements.

**[Claim 9]** 9. The scintillator–collimator combination of claim 8 wherein the scintillator module further comprises a locating pin constructed to snugly engage a recess of the comb, wherein the recess is defined between a pair of the second set of teeth.

**[Claim 10]** 10. The scintillator–collimator combination of claim 9 wherein the locating pin is configured to align the scintillator pack with respect to the plurality of collimator elements such that the scintillator module does not overlap two collimator elements spaced apart from one another a distance equal to a width of the scintillator module.

**[Claim 11]** 11. The scintillator–collimator combination of claim 8 wherein the first set of teeth and the second set of teeth define a distance between collimator elements.

**[Claim 12]** 12. The scintillator–collimator combination of claim 8 configured to be optically coupled to a photodiode array and configured to

detect illumination from the scintillator pack and output electrical signals responsive thereto.

**[Claim 13]** 13. The scintillator–collimator combination of claim 8 incorporated into a CT imaging system designed to acquire diagnostic data of a medical patient.

**[Claim 14]** 14. A CT system comprising:

- a rotatable gantry having a bore centrally disposed therein;
- a table movable fore and aft through the bore and configured to position a subject for CT data acquisition;
- a high frequency electromagnetic energy projection source positioned within the rotatable gantry and configured to project high frequency electromagnetic energy toward the subject; and
- a detector array disposed within the rotatable gantry and configured to detect high frequency electromagnetic energy projected by the projection source and impinged by the subject, the detector array including:
  - a plurality of scintillator modules, each having a scintillator array and an indexing pin;
  - a collimator assembly having a plurality of collimator plates; and
  - a detector support having at least one comb of alignment teeth, the alignment teeth constructed to align the plurality of collimator plates, and constructed to engage an indexing pin to align a scintillator array with the plurality of collimator plates.

**[Claim 15]** 15. The CT system of claim 14 wherein the at least one comb includes a first set of teeth extending in a first direction and a second set of teeth extending in a second direction different from the first direction, and wherein the second set of teeth engage a pin.

**[Claim 16] 16.** The CT system of claim 15 wherein the alignment teeth define a uniform spacing between collimator plates of the plurality of collimator plates.

**[Claim 17] 17.** The CT system of claim 15 wherein the second set of teeth extends beyond an edge of the collimator plates.

**[Claim 18] 18.** The CT system of claim 15 wherein second set of teeth flank the indexing pin.

**[Claim 19] 19.** The CT system of claim 14 wherein the indexing pin laterally extend beyond an end of a respective scintillator array.

**[Claim 20] 20.** A method of manufacturing a CT detector comprising the steps of:

- providing a scintillator array having at least one locator extending beyond the scintillator array;

- providing a comb having a plurality of teeth constructed to define a spacing between collimating elements of a collimator; and

- positioning the at least one locator between at least two of the plurality of teeth.